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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/625,897	07/24/2003	Axel Von Bergen	13909-118001 / 2003P00313	1193

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EXAMINER	
BRADLEY, MATTHEW A	

ART UNIT	PAPER NUMBER
2187	

DATE MAILED: 10/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/625,897	VON BERGEN ET AL.	
	Examiner	Art Unit	
	Matthew Bradley	2187	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 August 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 4-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 4-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2 August 2006 has been entered.

Claim Status

Claims 1 and 4-30 remain pending and are ready for examination.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims **1**, **11-13**, **21**, and **27-30** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chung, (U.S. 7,007,149), hereinafter referred to as Chung, and in view of McMahon et al (U.S. 5,784,699), hereinafter referred to as McMahon.

As per independent claim **1**, Chung teach,

- an associated block of memory divided into a plurality of frames, with each of the plurality of frames operable to store an indexing structure associated with a single attribute of a data record, and each of the plurality

of frames divided into a plurality of instances, with each of the plurality of instances operable to store an index node of the indexing structure (Column 3 lines 17-26 as shown in Figures 1-3).

Chung does not explicitly teach maintaining unused instances.

McMahon teach,

- a data structure identifying the unused instances within each of the plurality of frames; and (Column 5 lines 30-31)

McMahon further teach,

- an application interface operable to receive a request for an unused instance from a software application, (Column 5 lines 25-27)
- wherein the frame handler is operable to identify an unused instance in response to a request received by the application interface. (Column 5 lines 30-35).

Chung and McMahon are analogous art because they are from the same field of endeavor namely, memory allocation.

At the time of invention, it would have been obvious to one of ordinary skill in the art, having both the teachings of Chung and McMahon before him/her to combine the free list maintaining technique of McMahon with Chung for the benefit of improved searching for free memory based on size of memory request to increase speed.

The suggestion for doing so would have been that, this technique supports fast searching of appropriately sized memory blocks in response to memory requests

because any memory block in a given free list is known to satisfy the request (Column 2 lines 47-50 of McMahon).

Therefore, it would have been obvious to combine Chung with McMahon for the technique of maintaining free memory lists in McMahon for improved searching to obtain the invention as specified in claims 1, 11-13, 21, and 27-30.

As per independent claim **11**, the combination of Chung and McMahon teach,

- outputting a request from an application to an operating system for allocation of a block of memory by the operating system to the application; (Column 5 lines 25-27 of McMahon)
- accessing the block of memory at the application; (Column 5 lines 30-39 of McMahon)
- dividing the block of memory into a plurality of frames, with each of the plurality of frames operable to store an indexing structure associated with a single attribute of a data record; dividing each of the plurality of frames into a plurality of instances, with each of the plurality of instances operable to store an index node of the indexing structure; and (Column 3 lines 17-26 as shown in Figures 1-3 of Chung)
- maintaining a data structure identifying the unused instances within each of the plurality of frames. (Column 6 lines 21-25 of McMahon).

As per dependent claim **12**, the combination of Chung and McMahon teach, maintaining a data structure identifying the unused instances within each of the plurality

of frames further comprises creating a frame node corresponding to each of the frames (Column 6 lines 21-25 of McMahon).

As per dependent claim **13**, the combination of Chung and McMahon teach, maintaining a data structure identifying the unused instances within each of the plurality of frames further comprises associating a list of unused instances with each frame node (Column 6 lines 21-25 of McMahon).

As per independent claim **21**, the combination of Chung and McMahon teach,

- accessing a block of memory for an application; (Column 5 lines 30-39 of McMahon)
- dividing the block of memory into a plurality of frames, including first and second frames, with each of the plurality of frames operable to store an indexing structure associated with a single attribute of a data record; dividing each of the plurality of frames into a plurality of instances, including first and second instances, with each of the plurality of instances operable to store an index node of the indexing structure; (Column 3 lines 17-26 as shown in Figures 1-3 of Chung)
- assigning a first identifier that is associated with the first frame to a first frame node; (Column 6 lines 21-25 of McMahon) *The Examiner notes that free list 1 is associated with a first memory portion having 16 byte blocks free.*
- linking the first list of instances to the first frame node; (Column 6 lines 21-25 of McMahon)

- assigning a second identifier that is associated with the second frame to a second frame node; (Column 6 lines 21-25 of McMahon) *The Examiner notes that free list 2 is associated with a second memory portion having 32 byte blocks free.*
- linking the second list of instances to the second frame node; (Column 6 lines 21-25 of McMahon)
- constructing a data structure using a plurality of nodes including the first node and the second node; (Column 6 lines 21-25 as shown in Table 1 of McMahon)
- and selecting available instances within the plurality of frames using the data structure, via an application (Column 5 lines 25-39 of McMahon).

As per dependent claim **27**, the combination of Chung and McMahon teach, further comprising: determining an origin list from which the available instances were selected; and returning the available instances to the origin list (Column 6 lines 21-25 of McMahon).

As per dependent claim **28**, the combination of Chung and McMahon teach, wherein determining the origin list comprises matching an identifier of the available instances to the first identifier or the second identifier (Column 6 lines 21-25 of McMahon).

As per dependent claim **29**, wherein matching the identifier comprises following a pointer to a first not_empty frame node of a not_empty subset of the plurality of nodes,

the not_empty subset including not_empty frame nodes with associated memory available for use by the application (Column 6 lines 21-25 of McMahon).

As per dependent claim **30**, the combination of Chung and McMahon teach, wherein the first memory portion includes a frame into which a block of memory allocated from the operating system is divided (Column 5 lines 56-59 of McMahon).

Claims **4-10**, **14-20**, and **22-26** are rejected under 35 U.S.C. 103 (a) as being obvious over the combination of Chung and McMahon, and further in view of Sturges (U.S. 5,930,827), hereinafter referred to as Sturges.

As per dependent claim **4**, the combination of Chung and McMahon teach the limitations found in claims 1-3 for which the instant claim depend upon.

The combination of Chung and McMahon does not teach expressly "wherein the data structure further comprises a tree structure".

Sturges teaches, "wherein the data structure further comprises a tree structure" (Column 5 lines 16-27).

The combination of Chung and McMahon, and Sturges are analogous art because they are from a similar problem solving area in that both teach a dynamic memory allocation technique.

At the time of invention it would have been obvious to a person of ordinary skill in the art, having both the teachings of Chung and McMahon, and Sturges before him/her, to include a tree in Chung and McMahon to manage the free memory blocks as done in Sturges to allow Chung and McMahon to more efficiently manage and search free memory blocks with the use of a tree.

The motivation for doing so would have been "the present invention may be implemented as part of any system or subsystem that manages memory allocation of a memory pool" (Column 4 lines 42-44 of Sturges).

Therefore it would have been obvious to combine Chung and McMahon, with Sturges for the benefit of efficient management and search of free memory blocks with the use of a tree to obtain the invention as specified in claims 4-10.

As per dependent claim **5**, the combination of Chung, McMahon and Sturges teach, wherein the tree structure is an AVL tree (Column 5 lines 26-27 of Sturges). *The Examiner notes that an AVL tree is a binary search tree as found in Sturges.*

As per dependent claim **6**, the combination of Chung, McMahon and Sturges teach, wherein the tree structure includes a frame node associated with each of the plurality of frames (Column 6 lines 21-24 of McMahon). *The Examiner notes that as shown supra, each entry in the free list that corresponds to a memory block, is a node that points to a free frame or memory block.*

As per dependent claim **7**, the combination of Chung, McMahon and Sturges teach, wherein each frame node is associated with a list of unused instances within the associated frame (Column 6 lines 21-24 of McMahon). *The Examiner notes that each entry in the list is a free block of memory or an unused block of memory.*

As per dependent claim **8**, the combination of Chung, McMahon and Sturges teach, wherein the list of unused instances is represented as a ring structure (Column 12 line 66 to Column 13 line 2 of Sturges).

As per dependent claim **9**, the combination of Chung, McMahon and Sturges teach, an empty list storing each frame node having no unused instances; and a non-empty list storing each frame node having unused instances (Column 6 lines 21-25 show the empty list of McMahon) and (Column 6 line 31-33 teach of a non-empty list of McMahon). *Additionally, the Examiner notes that a logic level high or '1' is used by McMahon to identify groups that contain at least one available memory block* (Column 7 lines 5-23). *Alternatively, a logic level '0' would be used for blocks that do not contain available memory as taught in* (Column 7 lines 66-67).

As per dependent claim **10**, the combination of Chung, McMahon and Sturges teach, an operating system interface operable to allocate a block of memory such that the frame handler is operable to allocate an additional block of memory when the block of memory is exhausted (Column 8 lines 6-8 of Sturges).

As per dependent claim **14**, the combination of Chung, McMahon and Sturges teach, associating a list of unused instances with each frame node includes creating a ring data structure comprised of unused instances (Column 12 line 66 to Column 13 line 2 of Sturges).

As per dependent claim **15**, the combination of Chung, McMahon and Sturges teach, maintaining a data structure identifying the unused instances further comprises organizing the frame nodes in a tree structure (Column 5 lines 16-27 of Sturges).

As per dependent claim **16**, the combination of Chung, McMahon and Sturges teach, the tree structure is an AVL tree (Column 5 lines 26-27 of Sturges). *The Examiner notes that an AVL tree is a binary search tree as found in Sturges.*

As per dependent claim **17**, the combination of Chung, McMahon and Sturges teach, creating an anchor data structure including a ring including an empty list and a non-empty list (Column 6 lines 21-25 show the empty list of McMahon) and (Column 6 line 31-33 teach of a non-empty list of McMahon).

As per dependent claim **18**, the combination of Chung, McMahon and Sturges teach, wherein maintaining a data structure identifying the unused instances further comprises placing frame nodes with unused instances in the non-empty list and placing nodes without unused instances in the empty list (Column 6 lines 21-25 show the empty list of McMahon) and (Column 6 line 31-33 teach of a non-empty list of McMahon). *Additionally, the Examiner notes that a logic level high or '1' is used by McMahon to identify groups that contain at least one available memory block* (Column 7 lines 5-23). *Alternatively, a logic level '0' would be used for blocks that do not contain available memory as taught in* (Column 7 lines 66-67).

As per dependent claim **19,** the combination of Chung, McMahon and Sturges teach, dividing the block of memory into the plurality of frames includes associating a frame identifier with each of the plurality of frames (Column 3 lines 17-26 of Chung).

As per dependent claim **20**, the combination of Chung, McMahon and Sturges teach, wherein each frame node includes the frame identifier of its associated frame (Column 3 lines 17-26 of Chung).

As per dependent claim **22**, the combination of Chung, McMahon and Sturges teach, wherein constructing a data further structure comprises constructing an AVL tree

using the plurality of frame nodes (Column 5 lines 26-27 of Sturges). *The Examiner notes that an AVL tree is a binary search tree as found in Sturges..*

As per dependent claim **23**, the combination of Chung, McMahon and Sturges teach, wherein selecting available instances using the data structure further comprises traversing the data structure to locate the available instances (Column 6 lines 9-20 of Sturges).

As per dependent claim **24**, the combination of Chung, McMahon and Sturges teach, superposing a linear list over the data structure, wherein the linear list includes a first pointer to an empty subset of the plurality of nodes that has no associated memory available for use by the application and a second pointer to a not_empty subset that has associated memory available for use by the application (Column 6 lines 21-25 show the empty list of McMahon) and (Column 6 line 31-33 teach of a non-empty list of McMahon). *The list over the data structure is shown as Table 1 and as shown supra, the dynamic memory allocator Additionally, the Examiner notes that a logic level high or '1' is used by McMahon to identify groups that contain at least one available memory block (*Column 7 lines 5-23). *Alternatively, a logic level '0' would be used for blocks that do not contain available memory as taught in* (Column 7 lines 66-67).

As per dependent claim **25**, the combination of Chung, McMahon and Sturges teach, following the second pointer to the first frame node; and using the first list of instances as the available instances (Column 5 lines 21-40 of McMahon).

As per dependent claim **26**, the combination of Chung, McMahon and Sturges teach, re-setting the second pointer to a second not_empty frame node in the

not_empty subset, and including the first node in the empty subset (Column 5 lines 21-40 of McMahon).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew Bradley whose telephone number is (571) 272-8575. The examiner can normally be reached on 6:30-3:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald A. Sparks can be reached on (571) 272-4201. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BRP/mb MB

Brian R. Peugh
Primary Examiner
10/16/06